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A CONTAINER

The present invention relates to a container which can hold tablets or liquids, for example, for use in the pharmaceutical, chemical and food industries and in particular to a child resistant locking arrangement for a container. The object of the invention is to ensure that the container is easy to open, in particular, for elderly and disabled persons and that the container is child resistant and can be sealed to prevent excessive ingress of water vapour.

Containers that have child resistant features are now generally available but these containers are typically very difficult for elderly or disabled persons to open. Reference should now be made to US patent No. 5908125 and other patents in the same area of technology. In general, child resistant containers require the user to simultaneously squeeze and turn the closure, or push and turn the closure, in order to release the closure from the container body. However, elderly persons or persons with dexterity problems find that the force required to squeeze or push the closure and simultaneously rotate the closure is too great or that they experience pain in attempting to open the closure. Those suffering from rheumatoid arthritis and osteoarthritis will find that they have to avoid any movement, which involves gripping, twisting or bending of the wrist.

Known child resistant containers comprise a cap locking arrangement whereby the user has to turn a cap and align two dots on the outer surface of the container. In this position, the cap can be pushed and then flipped open. However, after use, the user has to remember to turn the cap again so that the two dots are no longer aligned otherwise the container is more readily opened and is no longer child resistant. Furthermore, when this type of container is opened, the cap partially obscures the view of the contents of the container.

The present invention aims to overcome the disadvantages of the prior art containers by providing a container that is both child resistant and user-friendly for the elderly and disabled. Therefore, the force required to open the closure is relatively small and the opening procedure does not require the user to simultaneously apply a pushing force and a turning force.

According to a first aspect of the present invention, there is provided a container for solids or liquid comprising a hollow body which holds the contents and a closure which cooperates with the body to close the container, wherein the container comprises a locking part for securing the closure, the locking part being moveable with respect to both the body and the closure and wherein the locking part carries an indicator which must be aligned with a similar indicator on the body and/or the closure before the closure can be released by the locking part to open the container.

Preferably, the container comprises actuator means for moving the locking part, the arrangement being such that when the closure is removed from the body to open the container, the actuator means moves the locking part such that the indicators on the body and/or closure move from an aligned position to a misaligned position.

Preferably, the arrangement of the actuator means is such that when the closure is placed back onto the body to close the container and the indicators are aligned, the actuator means moves the locking part such that the indicators on the body and/or closure move from an aligned position to a misaligned position.

The actuator means ensures that the respective indicators are misaligned following the opening and/or closing of the container. The actuator means automatically moves the indicators out of alignment; therefore the child resistant feature is automatically activated during the opening operation and the closing operation.

Preferably, the closure and the locking part comprise respective cooperating locking elements, the arrangement being such that when the closure is removed from the body to open the container, the actuator means moves one of the locking elements relative to the other locking element.

Preferably, the arrangement of the cooperating locking elements located on the closure and the locking part is such that when the closure is pushed back onto the body to close the container, the actuator means moves one of the locking elements relative to the other locking element.

In an alternative embodiment the cooperating locking elements are located on the body and the locking part, the arrangement being such that when the closure is removed from the body to open the container, the actuation means moves one of the locking elements relative to the other locking element. Preferably, in this alternative embodiment the arrangement of the cooperating locking elements located on the body and the locking part is such that when the closure is pushed back onto the body to close the container, the actuation means moves one of the locking elements relative to the other locking element.

The locking part is preferably a locking ring.

Preferably, the actuator means comprises an elongate member disposed on the inside of the closure, and the locking ring comprises a ramp, the ramp being sloped such that when the elongate member makes contact with the ramp and is slid progressively along a surface of the ramp, rotation of the locking ring results such that the indicators on the body and/or closure and the locking part are no longer aligned.

Preferably, the arrangement of the elongate member and the ramp is such that when the closure is removed from the body to open the container, the elongate member makes contact with a first surface of the ramp and rotation of the locking ring results such that the indicators on the body and/or closure and the locking part are no longer aligned.

Preferably, the arrangement of the elongate member and the ramp is such that when the closure is placed back onto the body to close the container and the indicators are aligned, the elongate member makes contact with a second surface of the ramp and rotation of the locking

ring results such that the indicators on the body and/or closure and the locking part are no longer aligned.

Preferably, the ramp protrudes from a radially inner surface of the locking ring.

Alternatively, the ramp is a channel formed in the wall of locking ring, the central axis of the channel being at an angle from the axis of the ring.

Preferably, the elongate member is a flexible cantilever.

Preferably, the elongate member is hook shaped cantilever, extending from the inside surface of the closure.

The locking part is preferably located between the body and the closure.

The cooperating locking element located on the closure is preferably a lug.

In a first embodiment of the present invention the cooperating locking element located on the locking part is a circumferential flange on the inside surface of the locking part and the lug is formed on the elongate member, the flange being formed with a recessed portion through which the lug can pass during opening and closing of the closure.

The ramp is preferably disposed axially below the circumferential flange and generally inline with the recessed portion of the flange, the arrangement being such that there is a gap between the uppermost part of the ramp and the circumferential flange.

In a second embodiment of the present invention the cooperating locking element located the locking part is a circumferential track attached to the inside surface of the locking part and the lug is formed with a distal head part, the lug extends from an inner surface of the closure, the track being formed with an access hole through which the head of the lug can pass during opening and closing of the closure.

The ramp is preferably disposed axially above the circumferential track.

Preferably, the arrangement of the ramp and the flange is such that upon rotation of the locking part in one direction the lug first passes through the gap and generally aligns with the recess before the elongate member makes contact with the ramp.

Preferably, the body has an outlet, which can be sealed by a sealing element located on the closure.

In an alternative embodiment of the present invention the lug comprises a member formed with a barbed distal end.

According to a second aspect of the present invention, there is provided a method for locking a closure to a container according to the first aspect of the present invention, the method comprising automatically moving a locking part during the opening operation of the closure.

Preferably the method comprises automatically moving the locking part during the closing operation of the closure.

The method ensures that the closure is locked to the container following the opening and/or closing of the container.

Preferred embodiments of the present invention will now be described in detail, by way of example only, with reference to the accompanying drawings, of which:

Figure 1 is a perspective view of a first embodiment of a container in the closed and locked position;

Figure 2 is a perspective view of the container in Figure 1 when in the closed and unlocked position before the closure is opened;

Figure 3 is a perspective view of the container in Figure 1 with the closure opened;

Figure 4 is a top perspective view of the container in Figure 3;

Figure 5 is a side view in direction X of the container in Figure 2;

Figures 6, 7, 8 and 9 are left-hand side, right-hand side, top plan and bottom views respectively of the container in Figure 5;

Figure 10 shows slightly enlarged details of the ring in Figure 4;

Figure 11 shows further enlarged details of the locking mechanism inside the ring in Figure 10;

Figure 12 is a perspective view of a second embodiment of the container in the closed and locked position; and

Figures 13 and 14 are perspective views of the container in Figure 12 with the closure opened.

In Figures 1 to 11, the first embodiment of a container according to the present invention is depicted. The container comprises a hollow body 1 holding solid or liquid contents and a closure 2, which closes the container. A locking ring 3 is provided between the body 1 and closure 2 which can rotate between body 1 and closure 2. An indicator arrow A is located on body 1 and an indicator arrow B is located on closure 2. The locking ring 3 also carries an indicator arrow C and it is only when the indicator arrow C is aligned, by turning the locking ring, with the indicator arrows A and B (see Figure 2) that the closure 2 can be opened by lifting or flipping the projecting edge 4 of the closure 2. Clearly, an indicator arrow need only be provided on either the body 1 or the closure 2 but the user benefits from being able to align indicator arrow C on the locking ring 3 with either indicator arrow A or indicator arrow B.

An elongate member 6 extends in a direction away from the inner surface of the closure 2. The member 6 comprises a hook shaped distal end 6a. Disposed between the distal end 6a and the closure 2 is a wedge shaped lug 10.

The locking ring 3 is located on the body 1 by way of a snap fit between circular rib formed on an annular shoulder (not shown) on the body 1 and a corresponding circular recess 12 formed adjacent the lower inner edge of the ring 3. the arrangement is such that the ring 3 is secured to the body 1 but will rotate freely on the body.

In order that the closure 2 is locked onto the body 1, the locking ring 3 has a circumferential flange 8 on its inside surface. This flange 8 is formed with a recessed portion 9 through which the hook 6 and lug 10 can pass during opening and closing of the closure 2 if the arrows A, B, C are aligned. The lug 10 will sit under the flange 8 when the arrows are not aligned, thereby locking the closure 2 onto the body 1.

The locking ring 3 comprises a ramp 7 that is sloped from the axial direction of the ring 3 and extends from the inner surface of the ring 3. There is a gap 13 between the uppermost part of the ramp 7 and the flange 8 through which the lug 10 may pass when the arrows A, B, C are being aligned. The ramp 7 comprises an upper inclined surface 14 and a lower inclined surface 16 (hidden in the Figures). The arrangement is such that if the arrows A, B, C are aligned and the closure 2 is opened the distal end 6a of the hook 6 will make contact with the lower inclined surface 16 of the ramp 7 and rotate the locking ring 3 i.e., back to the locked position. Also, the arrangement is such that if the arrows A, B, C are aligned and the closure 2 is closed the distal end 6a of the hook 6 will make contact with upper inclined surface 14 of the ramp 7 and rotate the locking ring 3 i.e., back to the locked position. In this respect, it should be noted that the locking ring 3 is freely rotatable on the body 1 once the hook 6 has travelled down the ramp 7.

As an alternative, the ramp 7 could include a channel, which captures the tip of the hook 6 at the bottom of the ramp 7 whereby the hook 6 is only released when it has travelled to the top of the ramp 7. With this arrangement, the indicator arrow C is not aligned when the closure 2 has opened and the user can simply push the hook 6 over the flange 8 to close the closure 2.

The distal end 6a acts as an actuator that ensures that the respective arrow indicators are misaligned following the opening and/or closing of the container. The distal end 6a automatically moves the arrow indicators out of alignment during the opening operation and if necessary the closing operation. Therefore the child resistant feature is automatically activated during the opening operation and if necessary during the closing operation.

It should be noted that the hook 6 is flexible so that it is possible to push the closure 2 closed without aligning the hook 6 with the recessed portion 9. The lug 10 is sloped corresponding to the slope on the flange 8 so that it can simply be pushed over the flange 8 until the lug 10 slips beneath the flange 8 to lock the closure 2 onto the body 1.

The width of the recessed portion 9 is such that when the arrows A, B, C are aligned and the hook 6 sits at the bottom of the ramp 7, the lug 10 will be free to move out of the locking ring 3.

The body 1 in this embodiment has an annular opening 11 that is sealable by an annular rim 12 on the closure 2. This sealing arrangement helps prevent the ingress of water vapour which could affect the stability of the contents and also acts to prevent leakage if the contents are liquid.

In Figures 12, 13 and 14, a second embodiment of a container according to the present invention is depicted. The container comprises a tubular hollow body 20 holding solid or liquid contents and a closure 21, which closes the container. A locking ring 23 is provided between the body 20 and closure 21 which can rotate between body 20 and closure 21. An indicator arrow D is located on body 20 and an indicator arrow E is located on the locking ring 23. As with the first embodiment it is only when the indicator arrows are aligned, by turning the locking ring, that the closure 21 can be opened by lifting or flipping the projecting edge 24 of the closure 21.

In Figures 13 and 14, the closure 21 has been opened and the user is able to take out the contents. Since the closure 21 is hinged to the body 20 at point 25, there is no obstruction to emptying the contents as the closure 21 can sit right back as far as the hinge point 25 will allow.

The closure 21 is formed with an annular collar 25 extending around the perimeter of the closure 21. Extending from an inner surface of the closure 21 is an elongate member 26 formed with a frusto conical end 28 at the distal end thereof. A wedge shaped locking lug 38 is formed on an outer surface of the annular collar 25.

The locking ring 23 comprises an outer annular collar 31 and a radially inner annular track 32 formed with an inner annular channel and an upper annular slot 34. The inner annular channel is directly below the slot 34. The width of the slot 34 is less than the width of the annular channel. At one point on the slot 34 the width increases forming a circular access hole 36. The outer annular collar 31 is formed with a channel 37 that is sloped from the axial direction of the ring 23.

The locking ring 23 is located on the body 20 by way of a snap fit between a circular rib (not shown) formed on the body 20 and a corresponding circular recess (not shown) formed adjacent the lower inner edge of the ring 23 such that the ring 23 is secured to the body 20 but will rotate freely on the body.

The arrangement is such that if the arrows D and E are aligned the end 28 will be adjacent the hole 36 and the lug 38 will be at the lowermost end of the channel 37 and the closure 21 can be opened. As the closure 21 is opened the lug 38 will make contact with the upper inclined surface of the channel 37 and rotate the locking ring 23 i.e., back to the locked position. Also, the arrangement is such that if the arrows D and E are aligned and the closure 21 is closed the lug 38 will make contact with lower inclined surface of the channel 37 and rotate the locking ring 23 i.e., back to the locked position. In this respect, it should be noted that the locking ring 23 is freely rotatable on the body 20 once the lug 38 has travelled down the channel 37.

The body 20 in this embodiment has an annular opening 40 that is sealable by an annular rim 42 on the closure 2. This sealing arrangement helps prevent the ingress of water vapour which could affect the stability of the contents and also acts to prevent leakage if the contents are liquid.

The lug 38 acts as an actuator that ensures that the respective arrow indicators are misaligned following the opening and/or closing of the container. The lug 38 automatically moves the arrow indicators out of alignment during the opening operation and if necessary the closing operation. Therefore the child resistant feature is automatically activated during the opening operation and if necessary during the closing operation.

CLAIMS

1. A container for solids or liquid comprising a hollow body which holds the contents and a closure which cooperates with the body to close the container, wherein the container comprises a locking part for securing the closure, the locking part being moveable with respect to both the body and the closure and wherein the locking part carries an indicator which must be aligned with a similar indicator on the body and/or the closure before the closure can be released by the locking part to open the container.
2. A container as claimed in Claim 1, wherein the container comprises actuator means for moving the locking part, the arrangement being such that when the closure is removed from the body to open the container, the actuator means moves the locking part such that the indicators on the body and/or closure move from an aligned position to a misaligned position.
3. A container as claimed in Claim 2, wherein the arrangement of the actuator means is such that when the closure is placed back onto the body to close the container and the indicators are aligned, the actuator means moves the locking part such that the indicators on the body and/or closure move from an aligned position to a misaligned position.
4. A container as claimed in Claim 3, wherein the closure and the locking part comprise respective cooperating locking elements, the arrangement being such that when the closure is removed from the body to open the container, the actuator means moves one of the locking elements relative to the other locking element.
5. A container as claimed in Claim 3, wherein the arrangement of the cooperating locking elements located on the closure and the locking part is such that when the closure is pushed back onto the body to close the container, the actuator means moves one of the locking elements relative to the other locking element.
6. A container as claimed in claim 4, wherein the cooperating locking elements are located on the body and the locking part, the arrangement being such that when the closure is removed from the body to open the container, the actuation means moves one of the locking elements relative to the other locking element and the arrangement of the cooperating locking elements located on the body and the locking part is such that when the closure is pushed back onto the body to close the container, the actuation means moves one of the locking elements relative to the other locking element.
7. A container as claimed in any of the preceding claims, wherein the locking part is a locking ring.
8. A container as claimed in any of the preceding claims 2 to 7, wherein the actuator means comprises an elongate member disposed on the inside of the closure, and the locking ring comprises a ramp, the ramp being sloped such that when the elongate member makes contact with the ramp and is slid progressively along a surface of the ramp, rotation of the

locking ring results such that the indicators on the body and/or closure and the locking part are no longer aligned.

9. A container as claimed in claim 8, wherein the arrangement of the elongate member and the ramp is such that when the closure is removed from the body to open the container, the elongate member makes contact with a first surface of the ramp and rotation of the locking ring results such that the indicators on the body and/or closure and the locking part are no longer aligned.

10. A container as claimed in claim 8 or claim 9, wherein the arrangement of the elongate member and the ramp is such that when the closure is placed back onto the body to close the container and the indicators are aligned, the elongate member makes contact with a second surface of the ramp and rotation of the locking ring results such that the indicators on the body and/or closure and the locking part are no longer aligned.

11. A container as claimed in any one of claims 8 to 10, wherein the ramp protrudes from a radially inner surface of the locking ring.

12. A container as claimed in any one of claims 8 to 11, wherein in the ramp is a channel formed in the wall of locking ring, the central axis of the channel being at an angle from the axis of the ring.

13. A container as claimed in any one of claims 8 to 12, wherein the elongate member is a flexible cantilever.

14. A container as claimed in any one of claims 8 to 13, wherein the elongate member is hook shaped cantilever, extending from the inside surface of the closure.

15. A container as claimed in any one of the preceding claims, wherein the locking part is located between the body and the closure.

16. A container as claimed in claim 15, wherein the cooperating locking element located on the closure is a lug.

17. A container as claimed in claim 4, wherein the cooperating locking element located on the locking part is a circumferential flange on the inside surface of the locking part and the lug is formed on the elongate member, the flange being formed with a recessed portion through which the lug can pass during opening and closing of the closure.

18. A container as claimed in claim 17, wherein the ramp is disposed axially below the circumferential flange and generally inline with the recessed portion of the flange, the arrangement being such that there is a gap between the uppermost part of the ramp and the circumferential flange.

19. A container as claimed in claim 4, wherein the cooperating locking element located the locking part is a circumferential track attached to the inside surface of the locking part and the lug is formed with a distal head part, the lug extends from an inner surface of the closure, the track being formed with an access hole through which the head of the lug can pass during opening and closing of the closure.

20. A container as claimed in claim 19, wherein the ramp is preferably disposed axially above the circumferential track.

21. A container as claimed in claim 29, wherein the arrangement of the ramp and the flange is such that upon rotation of the locking part in one direction the lug first passes through the gap and generally aligns with the recess before the elongate member makes contact with the ramp.

22. A container as claimed in any one of the preceding claims, wherein the body has an outlet, which can be sealed by a sealing element located on the closure.

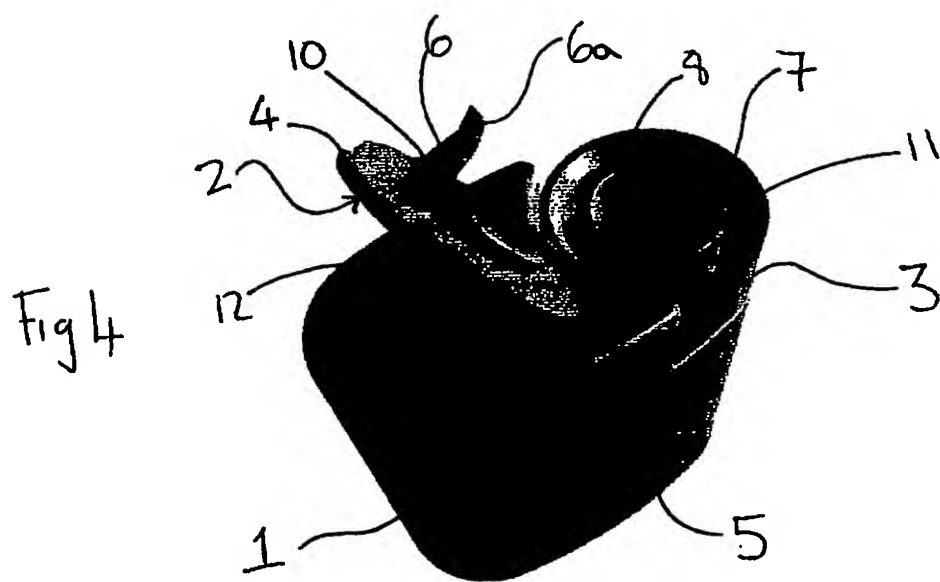
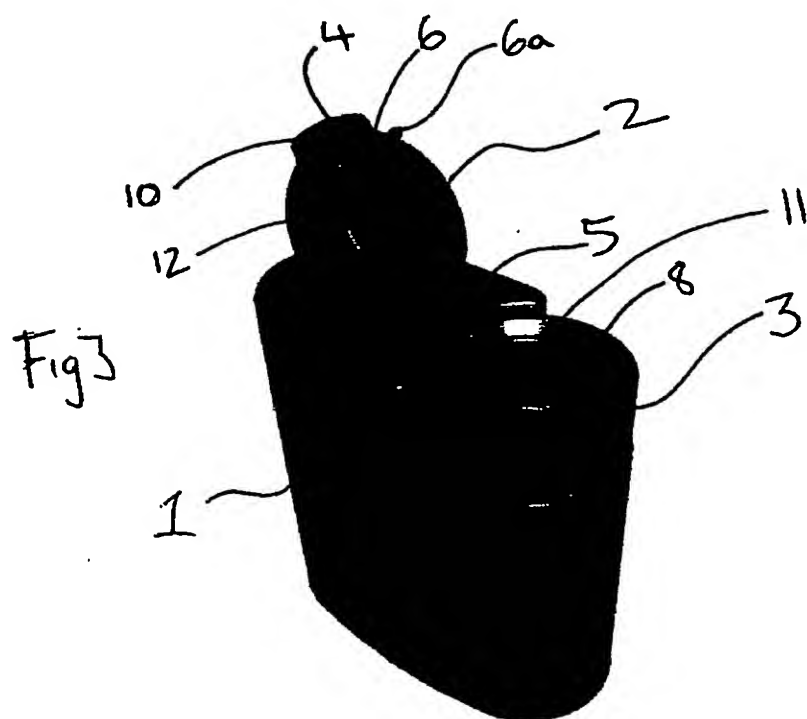
23. A container as claimed in any one of claims 19 to 22, wherein the lug comprises a member formed with a barbed distal end.

24. A method for locking a closure to a container according to the first aspect of the present invention, the method comprising automatically moving a locking part during the opening operation of the closure.

25. A method as claimed in claim 24, wherein the method comprises automatically moving the locking part during the closing operation of the closure.

26. A method as claimed in claim 24, wherein the method ensures that the closure is locked to the container following the opening and/or closing of the container.

The present invention relates to a container which can hold tablets or liquids, for example, for use in the pharmaceutical, chemical and food industries and in particular to a child resistant locking arrangement for a container. The object of the invention is to ensure that the container is easy to open, in particular, for elderly and disabled persons and that the container is child resistant and can be sealed to prevent excessive ingress of water vapour. The container comprises a hollow body holding solid or liquid contents and a closure, which closes the container. A locking ring is provided between the body and closure, which can rotate between body and closure. An indicator arrow is located on body and an indicator arrow is located on closure. The locking ring also carries an indicator arrow and it is only when the indicator arrow is aligned, by turning the locking ring, with the indicator arrows and that the closure can be opened by lifting or flipping the projecting edge of the closure.



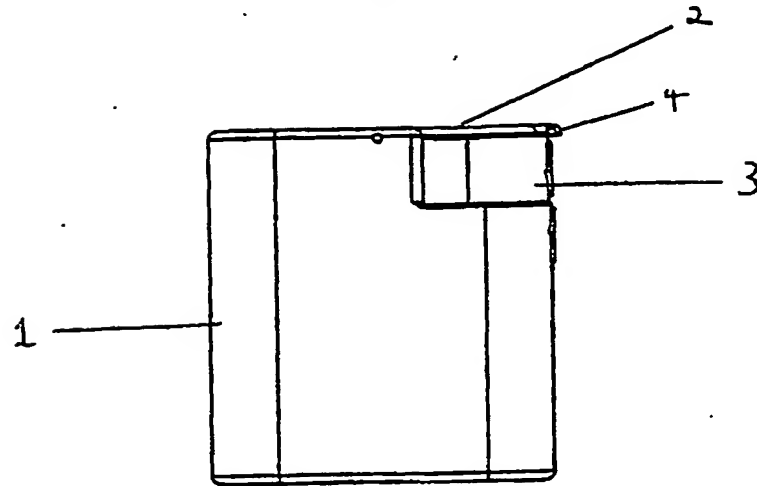


Fig 5

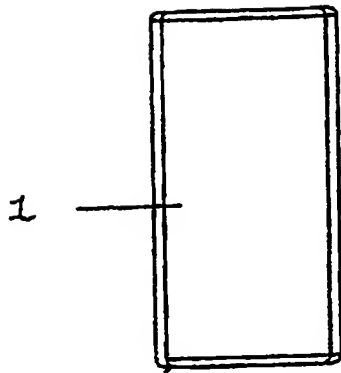


Fig 6

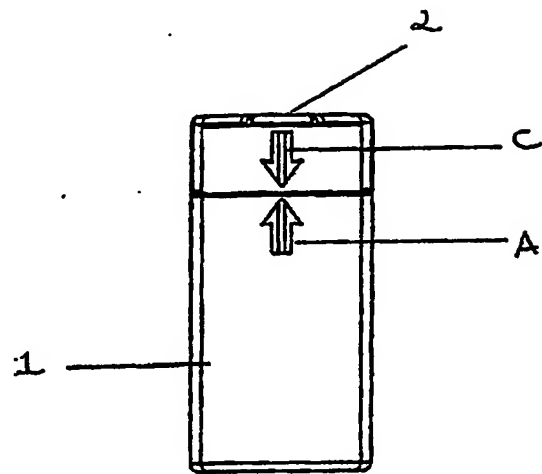


Fig 7

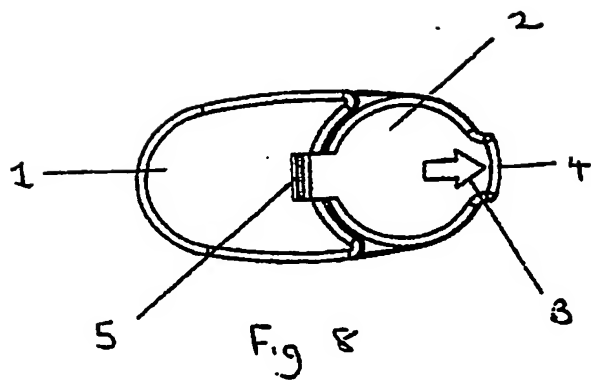


Fig 8

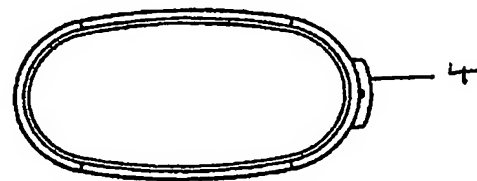


Fig 9

Fig 10

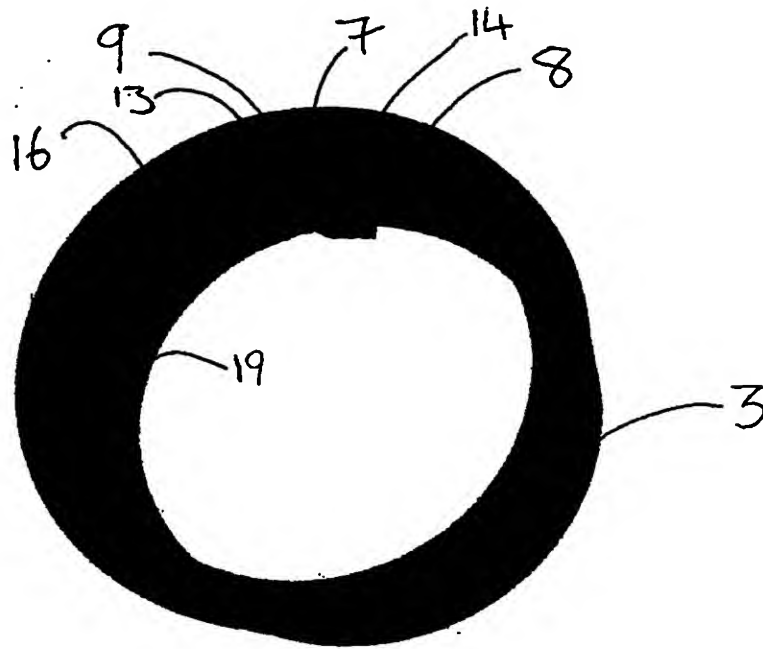
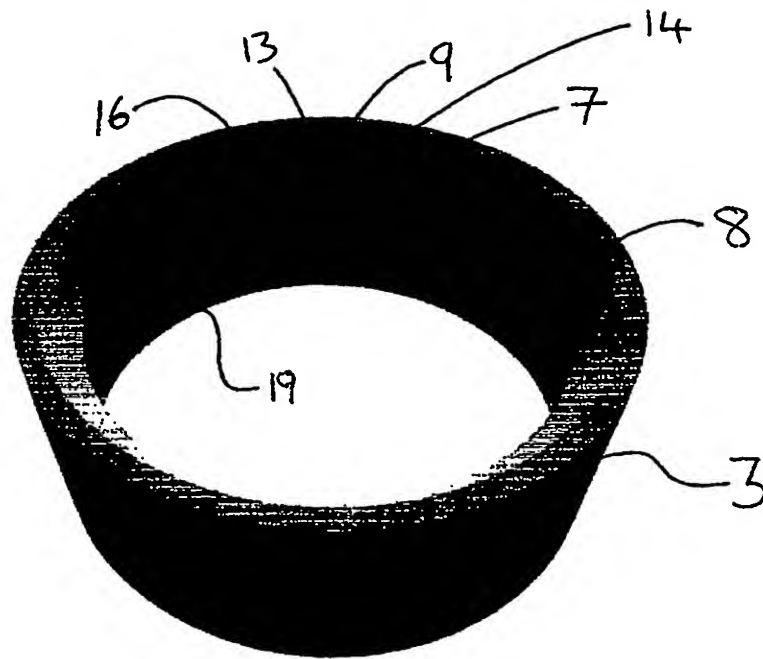


Fig 11



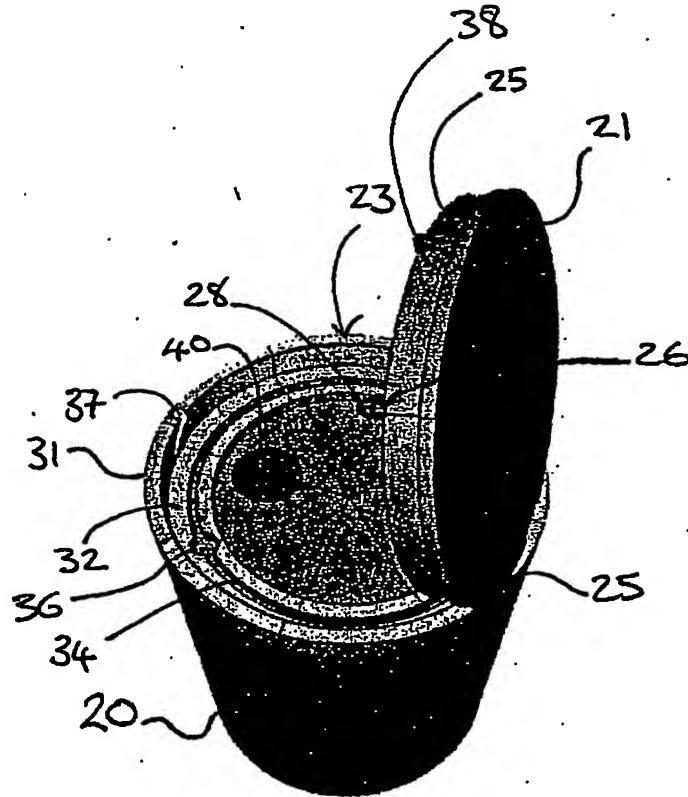


Fig 14

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